9 March 2004

FINAL

DESCRIPTION FOR PURCHASE 002 (DFP)

FOR THE

BLASTING MACHINE

1. FUNCTION. The blasting machine function is intended to provide a means to initiate electrical Blasting Caps, Shock tube with caps (M11, M12, M13, M15 and M16) and the Mine Clearing Line Charge (MICLIC) systems.

2. APPLICABLE DOCUMENTS

2.1 Documents. The following documents form a part of performance specification for the blasting machine and are specified within this document.

SPECIFICATIONS & STANDARDS

Military

MIL-STD-129N	Marking for Shipment and Storage
MIL-STD-331B	Fuze and Fuze Components, Environmental and Performance Tests For
MIL-STD-810F	Environmental Test Methods for Engineering Guidelines
MIL-STD-1472F	Human Engineering

INTERNATIONAL TEST OPERATING PROCEDURES

ITOP 4-2-602 - Rough Handling Tests

ITOP 7-2-512 - Simulated Air Drop - Weapons and Individual Equipment

(Copies of the above international test procedures are available from U.S. Army Test and Evaluation Center ATTN: AMSTE-CT-T, Aberdeen Proving Ground, MD 21005-5055)

2.1.1 Non-government publications. The following document(s) of the exact revision below form a part of this document to the extent specified herein.

A-A-208B Ink, Marking, Stencil, Opaque (Porous And Non-Porous Surfaces)

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM-D3951-98 Standard practice for Commercial Packaging

(Application for copies should be addressed to the American Society for testing and materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959)

AR 385-16, 2 Nov 01, System Safety Engineering and Management, Establishes the safety requirements for material release – paragraph 4q(9)

3. REQUIREMENTS

3.1 Design Verification. When specified in the contract, a sample(s) of the blasting machine shall be subjected to design verification in accordance with Table II.

3.2 Additional Design Verification. When specified in the contract, a sample(s) shall be subjected to a portion of the Design Verification Test in accordance with Table III.

3.3 Interface and interoperability. The blasting machine assembly shall comply with the exterior envelope, physical characteristics specified here in and shall perform the following functional and operational functions as specified herein.

3.3.1 Design, materials, and manufacturing processes. Unless otherwise specified, the design, materials and manufacturing process selected is the prerogative of the contractor as long as all articles submitted to the Government fully meet the functional and operating requirements specified.

3.3.2 Technical Manual. The contractor shall generate the tech manual in digital format and each unit pack shall contain the operating procedure and battery replacement procedure if applicable.

3.3.3 Quick Release Mechanism. The blasting machine shall have two (2) quick connect output terminals for the electrical blasting cap wires and one adaptor for the shock tube to facilitate the user in being able to connect the blasting cap wires or shock tube within five seconds while wearing Cold/Wet Weather Gloves and the MOPP IV gear under all conditions. No additional tools will be needed to connect to the blasting caps or the shock tube.

3.3.4 Wire and Shock tube Retention. The lead wires or shock tube shall not separate from the blasting machine when a pull force of 4 lbs minimal horizontal force is exerted on each of the lead wires while the blasting machine is held stationary. A pull force of 10 lbs of horizontal force is preferred.

3.3.5 Physical Envelop. The blasting machine physical size shall not exceed 6 inches wide by 7 inches long by 3 inches deep. Its maximum weight shall not exceed 1 pound 7 oz.

3.3.6 Self Test Mechanism. The blasting machine shall include a mechanism to provide a visual self-test capability verifying proper output of the machine. A mechanism internal/integral to the blasting machine is preferred but it may be a separate mechanism.

3.3.7 Shock tube. Shock tubes are plastic conduits of circular cross section, coated with a thin layer of reactive material on their inside walls. Nominal outside diameter are .118, .090, and .085 inches.

3.4 Operating Capability

3.4.1 Power. The blasting machine power shall be self-generated or battery powered.
If power is self-generated, the mechanism (pump, handle, lever, etc.) used to charge the blasting machine, shall require no more than fifteen (15) pounds or less than five (5) pounds of force to operate.

If the blasting machine is powered by battery(s), the battery(s) shall be operator replaceable and internal to the blasting machine and be capable of meeting all performance requirements using both rechargeable and non-rechargeable batteries. The item shall be so designed that the battery(s) can be easily replaced without the use of additional tools other than any standard

military tool. Batteries, recognized by Underwriters Laboratory, and which are readily available in the commercial marketplace and shall be: A, AA, AAA, 9-Volt, C or D size.

3.4.2 Output Capacity. The blasting machine shall produce a minimum output of one and five-tenths (1.5) amperes through a 150 +/- 2 ohms load for a period of up to one and five-tenths (1.5) milliseconds when tested as specified in 4.6.2.

3.4.3 Unactivated Voltage. The output voltage across the output terminals shall be one-tenth (0.1) volt or less within ten (10) seconds after the device has complied with the requirements of 3.4.2 and it is tested in accordance with 4.6.2.

3.4.4 Insulation Resistance. The blasting machine shall comply with the requirements of 3.4.2 when tested in accordance with 4.6.4 after having five hundred volts alternating current (500 VAC) applied between case and each output terminal.

3.4.5 Service life cycle. The blasting machine shall comply with the requirements of 3.4 for a minimum five thousand (5000) firing functions when tested in accordance with 4.6.5 and without any component replacement or repair except the shock tube initiation mechanism. If the shock tube initiation mechanism is a replaceable device, it should have a life of at least 150 firings before replacement is necessary and three spare mechanisms shall be included with each blasting machine. If the shock tube initiation mechanism is integral to the blasting machine or is otherwise a non-replaceable device it shall have a life of at least 1000 firings and shall include a counter which counts each usage of the mechanism. The counter shall have easily legible characters. If battery powered, the initial set of batteries shall have a life of 100 firing functions before replacing.

3.4.6 Shock tube Initiation. The blasting machine shall have a capability to initiate the shock tube under all operating environments specified herein.

3.5 Support and ownership. The Blasting Machine assembly shall possess the following characteristics.

3.5.1 Safety requirements. The blasting machine operation shall require two independent deliberate actions. The blasting machine must have a double positive safety feature that will prevent unwanted, accidental, or premature operation while operating at –25 ^{o}F and +125 ^{o}F. This requirement can be met when performing requirement 3.6.3 of this DFP.

3.5.2 Human factor. The blasting machine shall be able to be safely, rapidly, and reliably operated and maintained (e.g., battery replacement). Use Mil-STD-1472F for guidance.

3.5.3 Workmanship. All parts and assemblies shall be fabricated and finished in a thorough workmanlike manner and all manufacturing, processing, and assembly operations shall be correctly performed. They shall be free of burrs, chips, sharp edges, cracks, unblended radii, porosity, warpage, burn marks, checks, chipped edges, blisters, excess flash, dirt, grease, rust, salt deposits, visible raised cement seams, solder splash, corrosion products, and other defects and foreign matter which would affect their serviceability. The cleaning method used shall not be injurious to any part or assembly nor shall the cleaning agent contaminate the parts. All required markings should be neat, legible and sharply defined. All required packing should be dry. There shall be no chemical or electrochemical corrosive effects from the manufacturing process.

3.5.4 Packaging. The blasting machine shall be packaged per ASTM-D3951-98. The packaged blasting machines shall be palletized in a unitized configuration not to exceed 52 inches in length or width and 54 inches in height. At least one of the horizontal dimensions must be less than 47 inches. Gross weight of the loaded pallet shall be less than 2,500 pounds and capable of being transported throughout the logistics system without reconfiguration. Loaded pallets must permit 4-way entry of forklifts, and use of US and NATO handling devices, and material handling equipment (MHE).

3.5.4.1 Quantity. N/A

3.5.4.2. Transportation Marking. Each unit pack, barrier bag and exterior container shall be marked in accordance MIL-STD-129 requirements, except barrier bags shall be printed or stamped. The container finish shall accept standard commercial marking and meet the test requirement of A-A-208 without any specific surface preparation other than cleaning for inks and labels.

3.5.4.3. Logistic Marking. The unit, unit pack and intermediate containers shall contain the following markings for manufacturing and logistic trace ability:

NSN
Item Nomenclature
Serial Number
Date of Manufacture
Manufacturer
Lot Number

3.6 Environmental. The blasting machine assembly shall remain safe and functional under the following environmental conditions without damage or degradation in performance.

3.6.1 Operating Temperature. The Blasting machine shall be functional at the following climatic conditions:

a. Hot temperature up to 110 ^{o}F + 5 ^{o}F

b. Ambient temperature at 70 ^{o}F + 5 ^{o}F

c. Cold temperature down to -5 ^{o}F - 5 ^{o}F

3.6.2 Storage Life. The blasting machine in its storage/shipping package (except battery, if applicable) shall remain safe and functional with no degradation in performance:

a. After 20 years in protected and controlled storage.

b. After 1 years of unprotected and uncontrolled storage in all climatic conditions.

3.6.3 Storage Temperature. The blasting machine shall be capable of functioning at the operating temperatures after exposure to the following storage temperature conditions:

a. Hot Temperature up to 160 ^{o}F + 5 ^{o}F

b. Cold Temperature down to -50 ^{o}F - 5 ^{o}F

3.6.4 Thermal shock. The Blasting Machine shall show no evidence of material degradation; damage or failure and its performance shall not be degraded after exposure to the three (3) cycles of thermal shock.

3.6.5 High temperature and Humidity. The Blasting Machine shall show no evidence of material degradation, damage or failure (especially in its environmental seals) and must be operable after exposure to a high temperature of 160 ºF + 5 ºF and relative humidity of 100 percent.

3.6.6 Solar Radiation. The blasting machine shall show no evidence of material degradation, damage or failure and shall be operational after being exposed to solar radiation.

3.6.7 Salt/Fog. The blasting Machine shall show no evidence of material degradation, damage or failure and must be operable after being subjected to the effects of salt/fog.

3.6.8 Dust. The blasting Machine shall show no evidence of material degradation, damage or failure and must be operable after exposure to the effects of dust.

3.6.9 Sand. The blasting Machine shall show no evidence of material degradation, damage or failure and must be operable after exposure to the effects of blowing sand.

3.6.10 Waterproofness. The blasting machine shall function after being completely submerged under 5 feet of water at 70 ^{o}F + 5 ^{o}F for a minimum 10 minutes and maximum of 15 minutes.

3.6.11 Electromagnetic Environmental Effects (E^3). The blasting machine shall survive E^3 environments such as: Personnel electrostatic discharge (PESD), Helicopter electrostatic discharge (HESD), Electromagnetic Radiation, and Operational (EMRO). The blasting machine shall operate reliably and safely in its shipping, storage and tactical configurations. The blasting machine shall not be degraded or damaged as a result of the above environments in bare unit, intermediate pack with and without the outer pack configuration from stockpile to mission completion.

3.6.12 Five-foot Drop. The blasting machine shall remain safe and functional after exposure to five-feet drop conditions such as accidental free fall of the blasting machine during handling, maintenance or operations at operating temperatures.

3.6.13 Transportation Handling/Vibration. The packaged blasting machine shall remain safe and functional after being subjected to military transportation handling/vibration conditions.

3.6.14 Airdrop. The blasting machine in its packaging shall be capable of low velocity airdrop as a re-supply load from U.S Army, Air Force and U. S Marine aircraft without hazard to air crew or recovery personnel. The recovered blasting machine shall have no physical damage, and shall be fully functional.

TABLE I : REQUIREMENT/VERIFICATION CROSS REFERENCE MATRIX

METHOD OF VERIFICATION
N/A - NOT AVAILABLE
1. - ANALYSIS
2. - DEMONSTRATION
3. - EXAMINATION
4. - TEST

CLASS OF VERIFICATION
A - DESIGN VERIFICATION
B. Add'l Design Verification
C - CONFORMANCE

Verification Level for Conformance

Section 3	Verification Method					Verification Class&Level			Section 4
Requirement	N/A	1	2	3	4	A	B	C	VERIFICATION & REMARK
3. 3 Interface & Interoperability									
3. 3. 1	X								
3. 3. 2				X		X			4. 5. 2
3. 3. 3			X	X		X	X		4. 5. 3 Note 1
3. 3. 4				X	X	X	X	100%	4.5.4.1 & 4.5.4.2 Note 1
3. 3. 5			X	X		X	X		4. 5. 5
3. 3. 6				X	X	X	X	100%	4. 5. 6
3. 4 Operating Capability									
3. 4. 1			X	X	X	X	X		4. 6. 1
3. 4. 2					X	X	X	100%	4. 6. 2
3. 4. 3					X	X	X	100%	4. 6. 3
3. 4. 4					X	X	X	100%	4. 6. 4
3. 4. 5					X	X	X		4. 6. 5
3. 4. 6					X	X	X	100%	4. 6. 6
3. 5 Support and Ownership									
3. 5. 1			X	X	X	X			4. 7. 1
3. 5. 2		X	X	X		X	X		4. 7. 2
3. 5. 3			X	X		X	X	100%	4. 7. 3
3. 5. 4				X		X	X	100%	4. 7. 4
3. 5. 4. 1				X		X	X	100%	4. 7. 4. 1
3. 5. 4. 2				X		X	X	100%	4. 7. 4. 2
3. 5. 4. 3				X		X	X	100%	4. 7. 4. 3
3. 6 Environmental Req									
3. 6. 1					X	X	X	10	4.8.1 Note 2
3. 6. 2			X	X	X	X			4.8.2
3. 6. 3					X	X	X		4.8.3
3. 6. 4					X	X			4.8.4
3. 6. 5			X	X	X	X			4.8.5
3. 6. 6			X	X	X	X			4.8.6
3. 6. 7			X	X	X	X			4.8.7
3. 6. 8			X	X	X	X			4.8.8
3. 6. 9			X	X	X	X			4.8.9
3. 6. 10			X	X	X	X	X	5	4.8.10
3. 6. 11			X	X	X	X			4.8.11
3. 6. 12			X	X	X	X	X		4.8.12
3. 6. 13			X	X	X	X			4.8.13
3. 6. 14			X	X	X	X			4.8.14

Note 1. Sequential Test: Conduct 4.5.3 then 4.5.4

Note 2. For Comforamnce test, Equally divide test samples into two groups; Hot Temperature & Cold Temperature

Table II Design Verification Test Sequence & Qty

Hot Storage Test (4.8.3.a) — **Total Quantity: 10 Blasting Machines (Sequential Test)**

Conduct 4.8.3.a
then Conduct 4.6.2
then Conduct 4.6.3
then Conduct 4.6.4

Ambient Function Test (4.8.1.b) — **Total Quantity: 25 Blasting Machines (Sequential Test)**

Conduct 4.8.1.b
then Conduct 4.6.2
then Conduct 4.6.3
then Conduct 4.6.4

Cold Storage Test (4.8.3.b) — **Total Quantity: 10 Blasting Machines (Sequential Test)**

Conduct 4.8.3.b
then Conduct 4.6.2
then Conduct 4.6.3
then Conduct 4.6.4

Waterproofness Test (4.8.10) — **Total Quantity: 10 Blasting Machines (Sequential Test)**

10 Blasting Machines shall be subjected to the Waterproofness test.
then Conduct 4.6.2
then Conduct 4.6.3
then Conduct 4.6.4

Requirement	Qty	Test Method	
3. 3. 2	25	4.5.2	Note 1.
3. 3. 3	25	4.5.3	Note 1.
3. 3. 4	25	4.5.4	Note 1.
3. 3. 5	25	4.5.5	Note 1.
3. 3. 6	25	4.5.6	Note 1.
3. 4. 1	25	4.6.1.1 & 4.6.1.2	Note 1.
3. 4. 2	See Above	4.6.2	
3. 4. 3	See Above	4.6.3	
3. 4. 4	See Above	4.6.4	
3. 4. 5	5	4.6.5	
3. 5. 1	All VT Sample	4.7.1	
3. 5. 2	All VT sample	4.7.2	
3. 5. 3	All VT sample	4.7.3	
3. 5. 4	All VT sample	4.7.4	
3. 5. 4. 1	All VT sample	4.7.4.1	
3. 5. 4. 2	All VT sample	4.7.4.2	
3. 5. 4. 3	All VT sample	4.7.4.3	
3. 6. 1	See Above	4.8.1	
3. 6. 2	5	4.8.2	
3. 6. 3	See Above	4.8.3	
3. 6. 4	5	4.8.4	
3. 6. 5	5	4.8.5	
3. 6. 6	5	4.8.6	
3. 6. 7	5	4.8.7	
3. 6. 8	5	4.8.8	
3. 6. 9	5	4.8.9	
3. 6. 10	See Above	4.8.10	
3. 6. 11	12	4.8.11	4 Machines for each sub test (a, b, c)
3. 6. 12	5	4.8.12	
3. 6. 13	One shipping box	4.8.13	
3. 6. 14	One shipping box	4.8.14	Note 2

Note 1.Same test sample shall be used in 4.5.2-4.5.6, 4.6.1.1 & 4.6.1.2. These samples can be used in 4.8.1.b
Note 2. These test samples can be used in test 4.8.1.b, Operating Temp verification.

Table III Additional Design Verification Test Sequence & Qty

Hot Storage Test (4.8.3.a) — **Total Quantity: 5 Blasting Machines (Sequential Test)**

Conduct 4.8.3.a
then Conduct 4.6.2
then Conduct 4.6.3
then Conduct 4.6.4& 4.6.6

Ambient Function Test (4.8.1.b) — **Total Quantity: 20 Blasting Machines (Sequential Test)**

Conduct 4.8.1.b
then Conduct 4.6.2
then Conduct 4.6.3
then Conduct 4.6.4& 4.6.6

Cold Storage Test (4.8.3.b) — **Total Quantity: 5 Blasting Machines (Sequential Test)**

Conduct 4.8.3.b
then Conduct 4.6.2
then Conduct 4.6.3
then Conduct 4.6.4& 4.6.6

Waterproofness Test (4.8.10) — **Total Quantity: 15 Blasting Machines**

5 Blasting Machines shall be subjected to the Waterproofness test.
then Conduct 4.6.2
then Conduct 4.6.3
then Conduct 4.6.4& 4.6.6

Requirement	Quantity	Test Method	
3. 3. 2	**20**	**4.5.2**	Note 1.
3. 3. 3	**20**	**4.5.3**	Note 1.
3. 3. 4	**20**	**4.5.4**	Note 1.
3. 3. 5	**20**	**4.5.5**	Note 1.
3. 3. 6	**20**	**4.5.6**	Note 1.
3. 4. 1	**20**	**4.6.1.1 & 4.6.1.2**	Note 1.
3. 4. 2	**See Above**	**4. 6. 2**	
3. 4. 3	**See Above**	**4. 6. 3**	
3. 4. 4	**See Above**	**4. 6. 4**	
3. 4. 6	**See Above**	**4. 6. 6**	
3. 5. 2	**All VT Sample**	**4. 7. 2**	
3. 5. 3	**All VT Sample**	**4. 7. 3**	
3. 5. 4	**All VT Sample**	**4. 7. 4**	
3. 5. 4. 1	**All VT Sample**	**4. 7. 4. 1**	
3. 5. 4. 2	**All VT Sample**	**4. 7. 4. 2**	
3. 5. 4. 3	**All VT Sample**	**4. 7. 4. 3**	
3. 6. 1	**See Above**	**4. 8. 1**	
3. 6. 3	**See Above**	**4. 8. 3**	
3. 6. 10	**See Above**	**4. 8. 10**	
3. 6. 12	**5**	**4. 8. 12**	

Note 1. Same test sample shall be used for 4.5.2 – 4.5.6, 4.6.1.1 & 4.6.1.2. These sample can be used for 4.8.1.b

4. QUALITY ASSURANCE PROVISIONS

4.1 Classification of verification. The Verification requirements specified herein are classified as follows:

a. Design Verification (see 4.2).

b. Additional Design Verification (see 4.3).

c. Conformance Inspection (see 4.4).

4.1.1 Verification conditions. Unless otherwise specified, all verifications shall be performed in accordance with the test conditions specified in this specification.

4.1.2 Responsibility for inspection and standard quality assurance provisions. Unless otherwise specified herein or in the contract, the contractor is responsible for all inspections and tests required by this document.

4.2 Design verification. When specified in the contract, a sample of the blasting machine shall be subjected to design verification in accordance with Table I Requirement/Verification cross-reference matrix and Table II Design Verification Test Sequence and Quantity.

4.2.1 Design verification test rejection. If any test samples fails to comply with the design verification requirements, the design shall be rejected.

4.3 Additional design verification test inspection. When specified in the contract or purchase order, a sample of the blasting machine assembly shall be subjected to an additional design verification test in accordance with Table I Requirement/Verification cross-reference matrix and Table III Additional Design Verification Test Sequence and Quantity.

4.3.1 Additional design verification test rejection. If any test samples fail to comply with the additional design verification test requirements, the design shall be rejected.

4.4 Conformance Verification. Unless otherwise specified in the contract, the item(s) shall be returned to the lot after successful completion of testing. If the item(s) fail the conformation tests for 4.8.1 and 4.8.10, the lot shall be rejected. Any item(s) that fail other conformance tests shall be set aside and be reworked or replace with other units.

4.5 Interface and interoperability verification.

4.5.1 Blank

4.5.2 Technical manual verification. Verify the operating procedure and the battery replacement procedure (if applicable) by conducting them per the enclosed manual.

4.5.3 Quick Release Mechanism. Verify the blasting machine has a quick release terminals mechanism for connecting the blasting cap wires to the terminals and shock tube to shock tube adaptor. Connection of the blasting cap wires to the terminals shall be able to be completed within 5 seconds for each terminal with Cold/Wet Weather Gloves and the MOPP IV gear under all conditions.

4.5.4 Wire and Shock Tube Retention.

4.5.4.1 Affix the M6 blasting cap wires or equivalent to the terminals and apply a four-pound force (4 lbs.) horizontally on each lead wire for both leads while the blasting machine is held in place. The lead wires shall not separate from the blasting machine.

4.5.4.2 Affix the shock tube to the machine and apply four-pound forces (4lbf) horizontally on shock tube while the blasting machine is held in place. The shock tube shall not separate from the blasting machine

4.5.5 Blasting Machine Physical Envelop Verification. Verify that the blasting machine meet the physical envelop and weight requirement.

4.5.6 Self-test Mechanism Verification. Verify the self-test mechanism requirement of paragraph 3.3.6 when the specific output of paragraph 3.4.2 is applied to the self-test mechanism prior to every function test of the applicable verification tests sequence and after being subjected to the same environment condition.

4.6. Operating Capability Verification.

4.6.1 Power.

4.6.1.1 Self-generating Force. Verify that the force required to operate a self-generating blasting machine meets the requirements of 3.4.1 if applicable.

4.6.1.2 Replacing Battery. Verify that the blasting machine battery(s) do not require any special tools to change and replacing a battery operation be accomplished while the wearing Cold/Wet Weather Gloves and the MOPP IV gear under all conditions. Also, verify that the batteries are internal to the blasting machine as specified in 3.4.1.

4.6.2 Output Capacity. The blasting machine shall produce the specified output requirements of 3.4.2 when it is tested in series with a resistive load of one hundred and fifty plus or minus two (150+ or - 2) ohms within the second (2nd) activation cycle minimum and the fifth (5th) activation cycle maximum for a self-generating blasting machine and on the first attempt for a battery powered blasting machine. Once the device has successfully fired, the sample shall be tested for inactivated voltage requirement in accordance with 4.6.3. The device under test shall then fire twice more on successive attempts per the above procedure and comply with the output requirements. Any device that fails to meet the requirement of 3.4.3 shall be classed as defective. The device under test shall also comply with the inactivated voltage requirements after each firing. If the device fails to comply with all of the specified requirements it shall be classed as defective and removed from the lot. Data shall be retained on all firings by recording the output trace displayed on an oscilloscope. If the failure is attributable to the battery performance, replace the battery with a known functional battery then conduct the test again.

4.6.3 Unactivated Voltage. Verify the blasting machine meets the requirement of 3.4.3 after functioning, using a digital readout voltmeter with a minimum input impedance of ten (10) mega-ohms. Any devise measuring an output in excess of the specified requirement of 3.4.3 shall be classified as defective.

4.6.4 Insulation Resistance. Verify the blasting machine meets the requirement of 3.4.4. The voltage shall be applied for a minimum of ten (10) seconds and there shall be no evidence of current leakage in excess of ten (10) microamperes. The blasting machine shall be tested for the specified requirements using approved test equipment. After passing the insulation resistance test requirements, the machine shall be tested for output capacity in accordance with 4.6.2.
If the sample fails to comply with any the specified requirements, it shall be classed defective.

4.6.5 Service Life Cycle. The blasting machine shall be tested for the specified amount of functions in accordance with the 4.6.2. An exception to 4.6.2 is that a photograph/data shall not be required on every function. Instead, photographs/data shall be required on the first output and every five hundredth (500th) output there after. Verify that the life of the shock tube initiation mechanism meets the requirements of paragraph 3.4.5 by performing the shock tube initiation test (paragraph 4.6.6). Also, if the shock tube initiation mechanism is integral to the blasting machine verify that the counter accurately accounts the activations during this test. If the sample fails to comply with any of the specified requirements it shall be classed as defective. If the machine is battery powered, changing batteries is allowed during this test. Verify that the battery life meets 100 functions (**DESTRUCTIVE TEST).**

4.6.6 Initiation of Shock Tube. Insert the clean-cut shock tube into the machine and tighten the restraining mechanism to secure the shock tube then activate the blasting machine. Verify the blasting machine meets the requirement of 3.4.6. If the failure is attributable to the battery performance, replace the battery with a known functional battery then conduct the test again.

4.7 Support and Ownership Verification

4.7.1 Safety Verification. Verify and demonstrate the blasting machine has a double safety feature.

4.7.2 Human Factor Verification Verify the Blasting machine shall be safely, rapidly, and reliably operated and maintained (e.g., battery replacement).

4.7.3 Workmanship Verification. Verify the workmanship on the production of the blasting machine by visual inspection or certification.

4.7.4 Packaging. Verify that the dimensions of packed containers do not exceed the specified dimensions and weight per paragraph 3.5.4.

4.7.4.1 Quantity. N/A

4.7.4.2 Transportation Marking. Verify by demonstrating that the container will accept standard commercial marking when tested IAW A-A-208. Verify the logistics markings, which meet the requirements of 3.5.4.2 for the unit, unit pack and intermediate packaging

4.7.4.3 Logistics Marking. Visually inspect marking to verify the logistic marking.

4.8 Environmental Verification

4.8.1 Operating Temperature Verification Test

a. Hot Temperature. Condition the Blasting machine assembly at 110 ^{o}F + 5 ^{o}F for a minimum of 24 hours twenty four plus four (24 + 4) hours prior to testing for the required output.

Perform the functional test within (5) minutes after the samples have been removed from the conditioning chamber. At the end of the soak period the unit shall be tested for the specified output in accordance with the test method in 4.6.2 & 4.6.6. The blasting machine shall function on the first attempt at the test temperature. Any unit failing to comply with all the specified requirements shall be classed defective **(NON-DESTRUCTIVE TEST).**

b. Ambient Temperature. Condition the Blasting machine assembly at 70 ^{o}F + 5 ^{o}F for a minimum of 24 hours twenty four plus four (24 + 4) hours prior to testing for the required output. Perform the functional test within (5) minutes after the samples have been removed from the conditioning chamber. At the end of the soak period the unit shall be tested for the specified output in accordance with the test method in 4.6.2 & 4.6.6. The blasting machine shall function on the first attempt at the test temperature. Any unit failing to comply with any of the specified requirements shall be classed as defective. (**NON-DESTRUCTIVE TEST**).

c. Cold Temperature. Condition the Blasting machine assembly at -5 ^{o}F - 5 ^{o}F for a minimum of 24 hours twenty-four plus four (24 + 4) hours prior to testing for the required output. Perform the functional test within (5) minutes after the samples have been removed from the conditioning chamber. At the end of the soak period the unit shall be tested for the specified output in accordance with the test method in 4.6.2 & 4.6.6. The blasting machine shall function on the first attempt at the test temperature. Any unit failing to comply with any of the specified requirements shall be classed as defective. (**NON-DESTRUCTIVE TEST**).

4.8.2 Storage Life Verification Test Verify the blasting machines meet the storage life requirement by conducting MIL-STD-331 test C1 on the unit pack configuration except that the low limit of cycling temperature will be - 40 ^{o}F. At the completion of the test, the blasting machine shall be tested per 4.6.2 & 4.6.6.

4.8.3 Storage Temperature Verification Test. The blasting machine assemblies in the packaged configuration shall be subjected to the following storage temperature.

a. Hot temperature. Condition the Blasting machine assembly at +160 ^{o}F + 5 ^{o}F for a minimum of seventy-two (72) hours. Following this conditioning, the machine shall be inspected for physical or mechanical deterioration. Then adjust the temperature to the maximum operating temperature of 110 ^{o}F + 5 ^{o}F and let it stabilize for a maximum of 4 hours. Perform the function test in accordance with 4.6.2 & 4.6.6 within (5) minutes after the samples have been removed from the conditioning chamber. Any device failing to comply with any of the specified requirements shall be classed as defective. (**NON-DESTRUCTIVE TEST**).

b. Cold temperature. Condition the Blasting machine assembly at -50 ^{o}F - 5 ^{o}F for a minimum of seventy-two (72) hours. Following this conditioning, the machine shall be inspected for physical or mechanical deterioration. Then adjust the temperature to the minimum operating temperature of -0 ^{o}F - 5 ^{o}F and let it stabilize for a maximum of 4 hours. Perform the function test in accordance with 4.6.2 & 4.6.6 within (5) minutes after the samples have been removed from the conditioning chamber. Any device failing to comply with any of the specified requirements shall be classed as defective. (**NON-DESTRUCTIVE TEST**).

4.8.4 Thermal Shock Verification Test. Perform the thermal shock test per MIL-STD-810, method 503.4 procedures II between - 40 ^{o}F to 145 ^{o}F on the blasting machine assemblies in the packaged configuration. Upon completion of the test, visually inspected for signs of damage that will have a negative impact on the physical form and fit requirements in section 3 of this spec. Any blasting machines sustaining such damage shall be considered defective. Following the

inspection, conduct the function test IAW 4.6.2 & 4.6.6. Any device failing to comply with any of the specified requirements shall be classed as defective. (**NON-DESTRUCTIVE TEST**).

4.8.5 High Temperature and Humidity Test. Perform the humidity test as per MIL-STD-810, Method 507.4 on the blasting machine. Upon completion of the test, the samples shall be visually inspected for signs of damages that have negative impact on physical form and fit requirements in section 3.4 of this spec. Any blasting machine sustaining such damages shall be considered as a failure. Following the inspection, conduct the function test IAW 4.6.2 & 4.6.6. Any sample failing to comply with any of the specified requirements shall be classed as defective. (**NON-DESTRUCTIVE TEST**).

4.8.6 Sunlight Radiation Test. Perform the solar radiation test per MIL-STD-810, Method 505.3, procedure II for four 24-hour cycles on the Blasting machine. Upon completion of the test, visually inspected for signs of damage that will have a negative impact on the physical form and fit requirements in section 3 of this spec. Any blasting machines sustaining such damage shall be considered defective. Following the inspection, conduct the function test IAW 4.6.2 & 4.6.6 any device failing to comply with any of the specified requirements shall be classed as defective. (**NON-DESTRUCTIVE TEST**).

4.8.7 Salt Fog Test. Perform a ninety-six (96) hour salt spray (fog) test on the blasting machine in accordance with MIL-STD-810, Method 509.4. Upon completion of this test procedure, inspect the blasting machine for evidence of surface degradation such as flaking, pitting, blistering or separation of the finish. Following the inspection, conduct the function test IAW 4.6.2 and 4.6.6 any sample failing to comply with any of the specified requirements shall be classed as defective. (**NON-DESTRUCTIVE TEST**).

4.8.8 Dust Test. Perform the blowing dust test on the Blasting machine per MIL-STD-810, Method 510.3, Procedure I. Upon completion of the test, visually inspected for signs of damage that will have a negative impact on the physical form and fit requirements in section 3 of this spec. Any blasting machines sustaining such damage shall be considered defective. Following the inspection, conduct the function test IAW 4.6.2 & 4.6.6. Any device failing to comply with any of the specified requirements shall be classed as defective. (**NON-DESTRUCTIVE TEST**).

4.8.9 Sand Test. The Blasting machine assembly shall be subjected to the blowing sand test in accordance with MIL-STD-810, Method 510.4, Procedure II. Upon completion of the test, visually inspected for signs of damage that will have a negative impact on the physical form and fit requirements in section 3 of this spec. Any blasting machines sustaining such damage shall be considered defective. Following the inspection, conduct the function test IAW 4.6.2. & 4.6.6 Any device failing to comply with any of the specified requirements shall be classed as defective. (**NON-DESTRUCTIVE TEST**).

4.8.10 Waterproofness Test. The blasting machine shall be completely submerged under 5 feet of water heated between 70 ^{o}F + 5 ^{o}F for a minimum of 10 minutes and maximum of 15 minutes. Any blasting machine emitting bubbles shall be classed as defective and removed from the lot. The blasting machines showing no evidence of leakage shall be operationally tested as specified in 4.6.2 & 4.6.6 for conformance with the requirements of 3.4. (**NON-DESTRUCTIVE TEST**).

4.8.11 Electromagnetic Environmental Effects (E^3).

a. PESD. Verify the blasting machine without any packaging shall not discharge any electrical output when subjected to Personnel electrostatic discharge criteria of MIL-STD-331, subset F1, F1.7.3.2.1. The blasting machine shall function in accordance with 4.6.2 & 4.6.6.

b. HESD. The blasting machines in the unit pack configuration shall be subjected to Helicopter ESD environment per MIL-STD-331, subtest F1, F1.7.3.2.2. The blasting machine shall function in accordance with 4.6.2 & 4.6.6.

c. EMRO. The blasting machines in the unit pack configuration shall be subjected Electromagnetic Radiation, Operational environment per MIL-STD-331, subtest F4. The blasting machine shall function in accordance with 4.6.2 & 4.6.6.

4.8.12 Five-feet Drop test. Perform the drop test on five samples, as follows. The blasting machines shall be conditioned at 70 ^{o}F + 5 ^{o}F for a period of four hours plus one hour (4 hrs + 1 hr). The machine shall then be dropped once, a vertical distance of five feet (5 ft) onto a solid concrete surface, with the following orientations.

Connector end down	Connector end up	Flat side (largest)	Any two corners
Unit #1	Unit #2	Unit #3,	Unit #4 & 5

Upon completion of the test, visually inspect for signs of damages that have a negative impact on the physical form and fit requirements in section 3 of this spec. Any machine sustaining such damage shall be considered as a failure. After examination, the blasting machine shall be tested in accordance with the test methods of 4.6.2 & 4.6.6 except that it shall indicate a successful firing three (3) sequential times. If the device fails to comply with any of the specified requirements, it shall be classed as defective. (**NON-DESTRUCTIVE TEST**)

4.8.13 Transportation handling/vibration test. Perform the transportation-handling test as per ITOP 4-2-602 on the packaged Blasting machines. Upon completion of the test, the samples shall be visually inspected for signs of damage for loose components, cracks, broken parts or other evidence of physical damage that have a negative impact on physical form and fit requirements in section 3 of this spec. Any blasting machines sustaining such damage shall be considered as defective. The remaining test samples shall be function tested IAW 4.6.2 & 4.6.6 except that it shall indicate a successful firing three (3) sequential times instead of just once. The three (3) sequential firings shall be the first three (3) attempts to fire after concluding the vibration test. If the sample fails to comply with any of the specified requirements it shall be classed as defective. (**NON-DESTRUCTIVE TEST**).

4.8.14 Air-drop test. Perform the simulated air-drop on the blasting machine in the packaged configuration as per ITOP 7-2-512, Simulated Air Drop for Weapons and Individual Equipment. The low velocity parachute air drop shall be simulated for this test. Blasting machines shall be tested in the fully packaged configuration (unit pack, intermediate pack and exterior pack). The tested samples shall be examined for visual damage. The undamaged and minimal damaged test

samples shall be function tested per 4.6.2 & 4.6.6. If the sample fails to comply with any of the specified requirements it shall be classed as defective. (**NON-DESTRUCTIVE TEST**).

5. PREPARATION FOR DELIVERY

5.1 Packaging. For acquisition purpose, the contract or order shall specify packaging requirements (see 6.2). When DOD personnel perform material packaging, those personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. The Inventory Control Point packaging activity within the Military Department of Defense Agency, or within the Military Department's System Command, maintains packaging requirements. Packaging data retrieval is available from the managing Military Department or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

6.1 Intended use. The assembly covered by this specification is intended for use as a blasting machine designed to detonate shock tube (MDI), simultaneously fifty (50) blasting caps connected in series (M6) with caps (M11, M12, M13, M15 and M16), DODIC (M174), MOPMS, APOBS and MICLIC.

6.2 Preferred power sources. A list of preferred power sources is available from:

Commander, CECOM
AMC Battery Management Office
ATTN: AMSEL-LC-P-AMC
Fort Monmouth, NJ 07703-5011

6.3 Ordering data. (Copies of specifications and standards required by the contractor(s) in conjunction with specific procurement functions should be obtained from the procuring activity or as directed by the Contracting Officer).

6.4 Data requirements submission. Unless otherwise instructed by the Contracting Officer, all submissions of required data shall be sent to: Commander, ARDEC, ATTN: AMSTA-AR-QAT, Dover, New Jersey 07801.